

An aerial photograph of the Chicago skyline at dusk. The city is densely packed with skyscrapers, many of which are illuminated with warm yellow lights. The Lake Michigan is visible in the background under a clear, light blue sky. The foreground shows the city's grid pattern and some green spaces.

ICC POLICY SESSION ON EV'S: THE BENEFICIAL ELECTRIFICATION OF TRANSPORTATION

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PLANNING FOR EV'S: A FRAMEWORK



Grid Partner



Environmental Ally



Economic Value Stacking



Consumer Need Nexus



Societal Benefit Connector



Grid Partner – Transportation & Future Electrification

Transportation



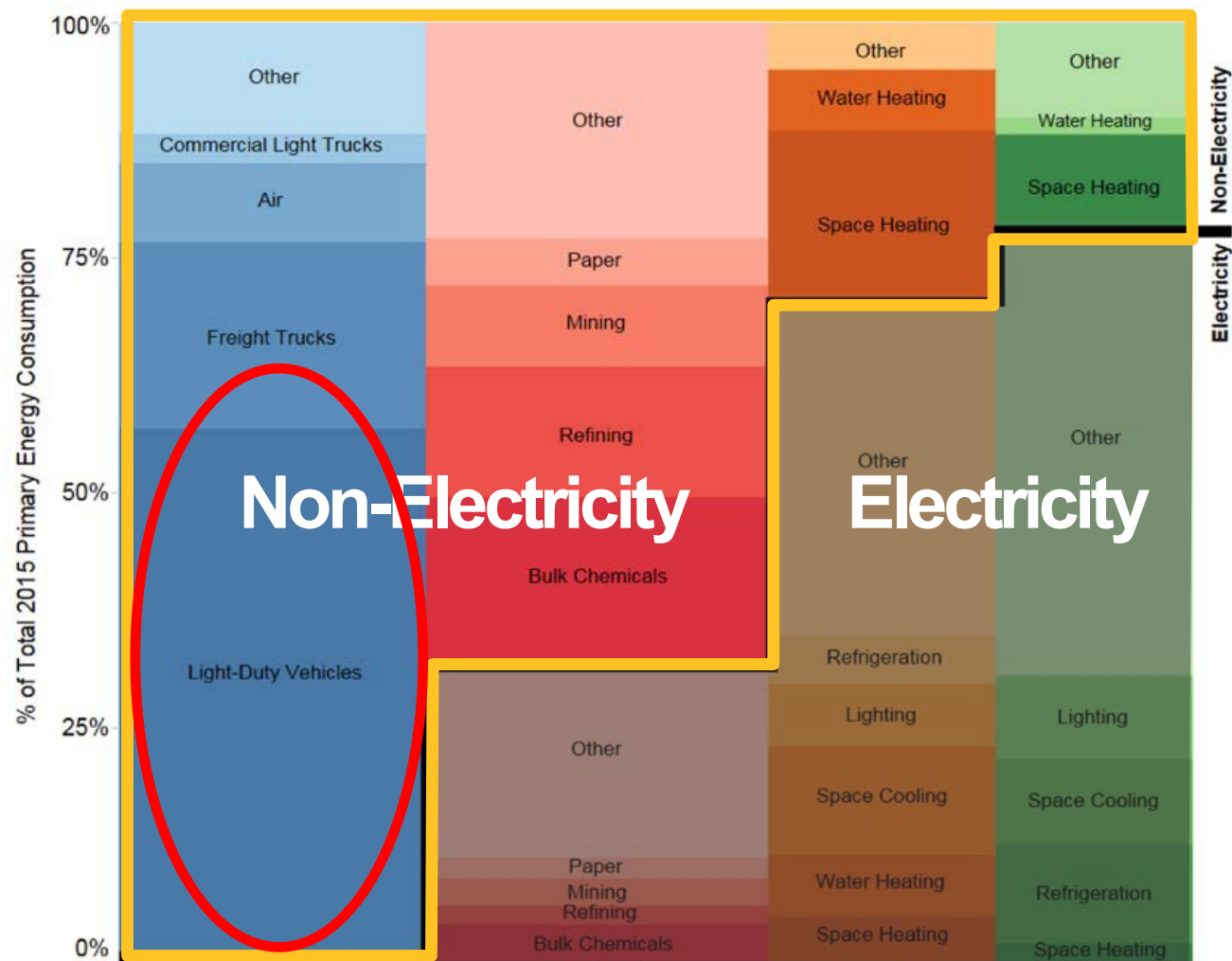
Industrial



Residential

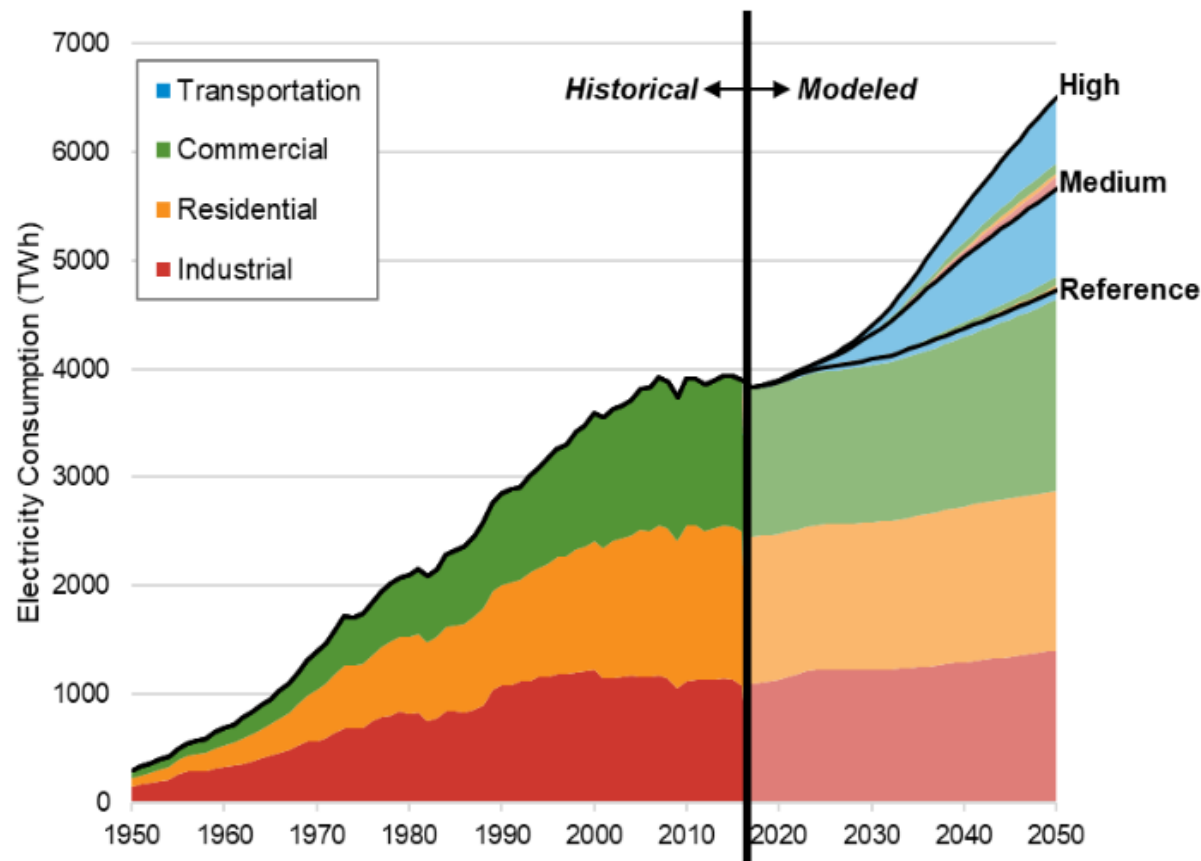


Commercial



LESS THAN HALF OF U.S. ENERGY CONSUMPTION IS ELECTRIFIED

Moderate technology advancements are shown. Slight adjustments were made to the modeled industry consumption estimates for 2017 – 2020 to align them with available historical data.

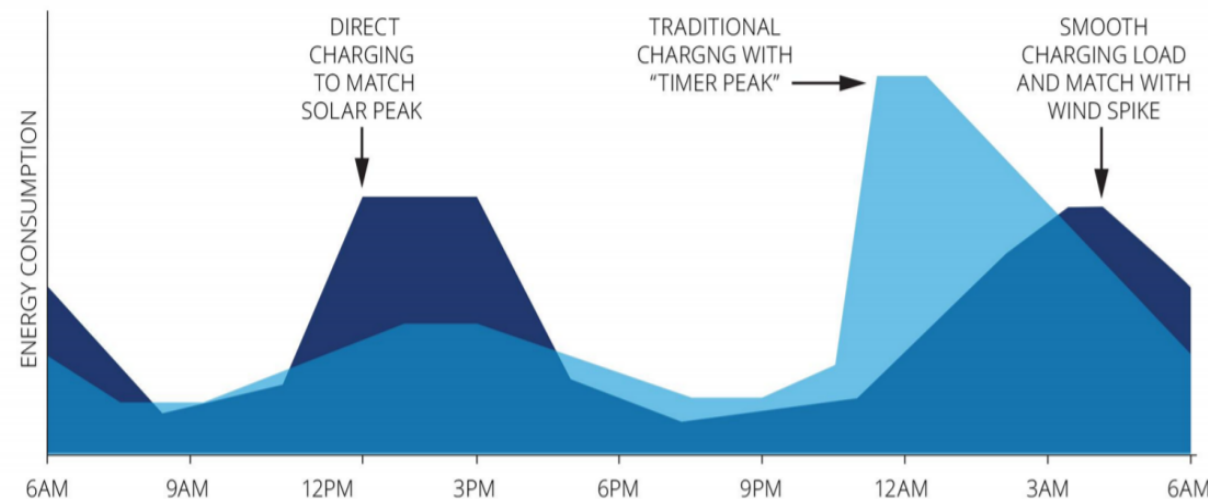
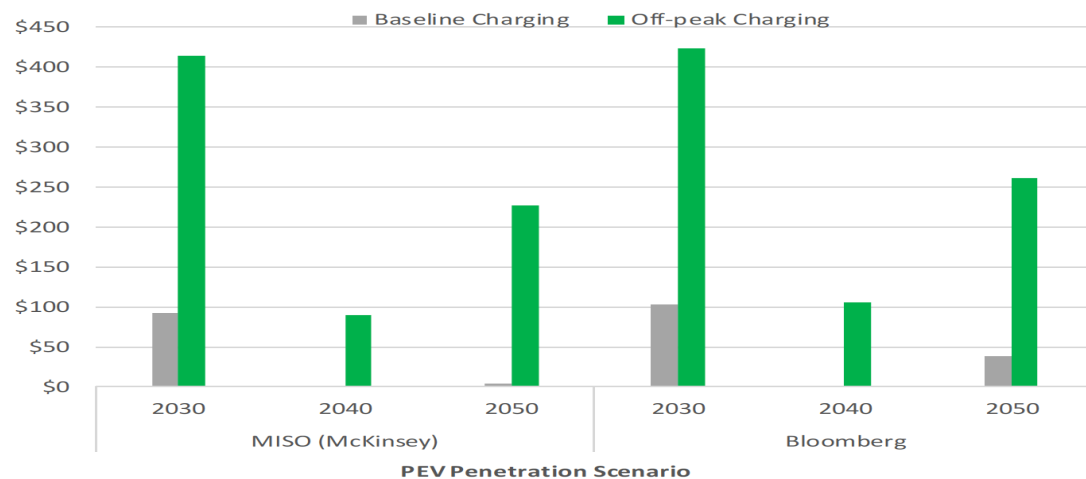


HISTORICAL & PROJECTED ANNUAL ELECTRICITY CONSUMPTION



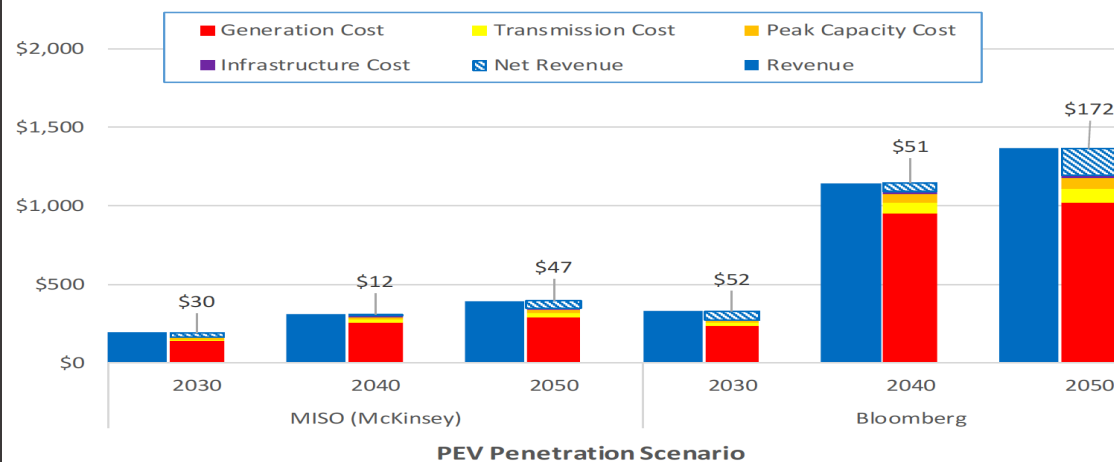
Grid Partner – Revenue & Load Growth Planning for Utilities

Illinois: NPV Lifetime Utility Net Revenue from PEV Charging
(\$/PEV, 10-year Lifetime)



BMW of North America, 2016 with edits by Smart Electric Power Alliance, 2017

Illinois: NPV Utility Costs & Net Revenue from PEV Charging
Off-peak Charging
(\$ millions)



Planning for EV Load Growth

Infra-
structure

Price Signals

Smart Charging

Static Rates

Dynamic Rates
+ Rebates

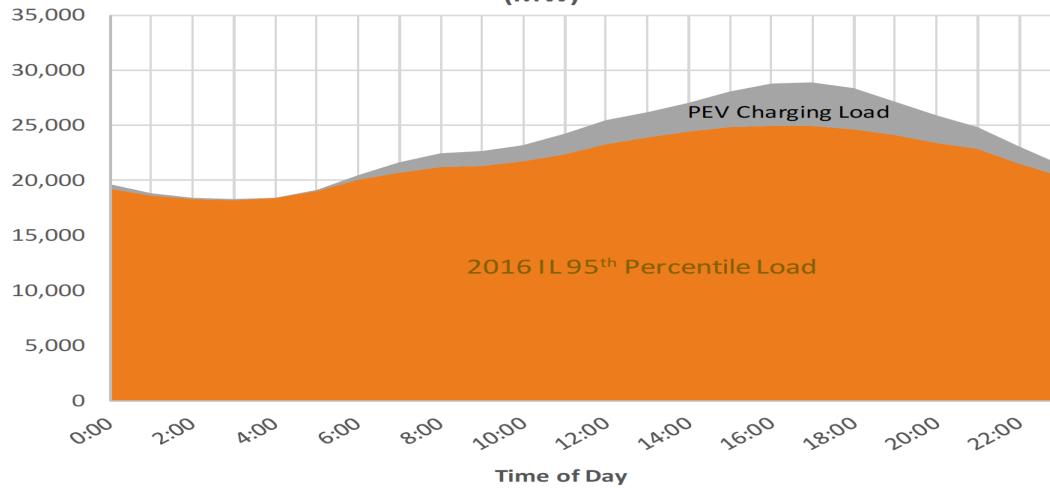
Connected
Smart Charging

Not-Connected
Smart Charging

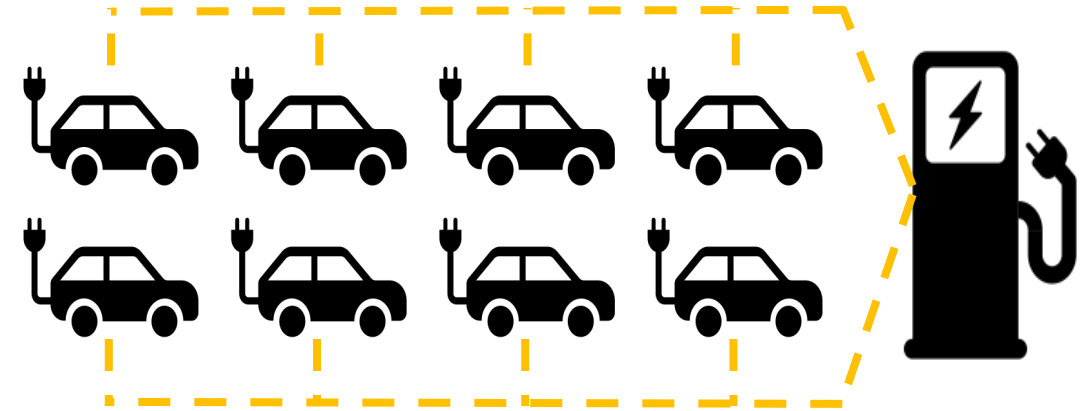
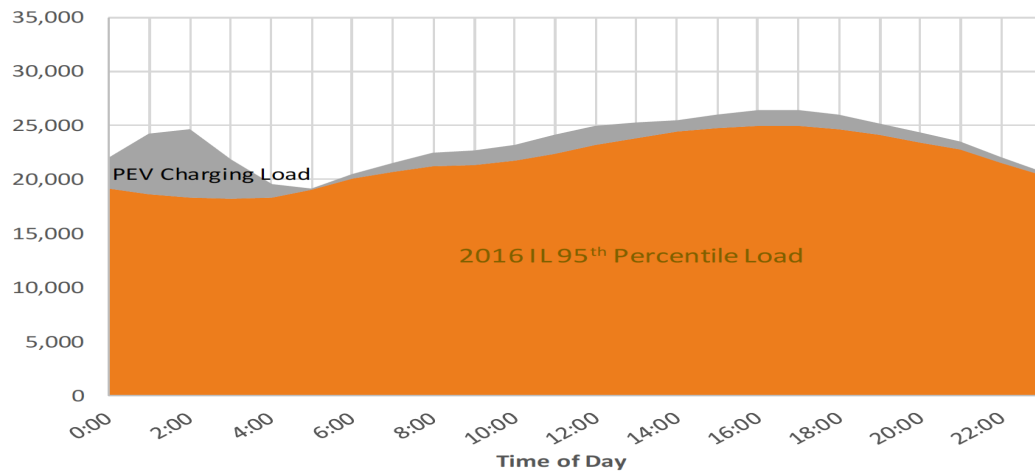


Environmental Ally – Cleaner Grid & More Efficiencies

Illinois PEV Charging Load
2040, Bloomberg Scenario, Baseline Charging
(MW)



Illinois PEV Charging Load
2040, Bloomberg Scenario, Off-peak Charging
(MW)



	<i>N</i>	<i>Mean Charge Efficiency (%) ± SD</i>
All charge events	114	85.7 ± 0.09
All Level 1 charge events	63	83.8 ± 0.08
All Level 2 charge events	51	89.4 ± 0.05

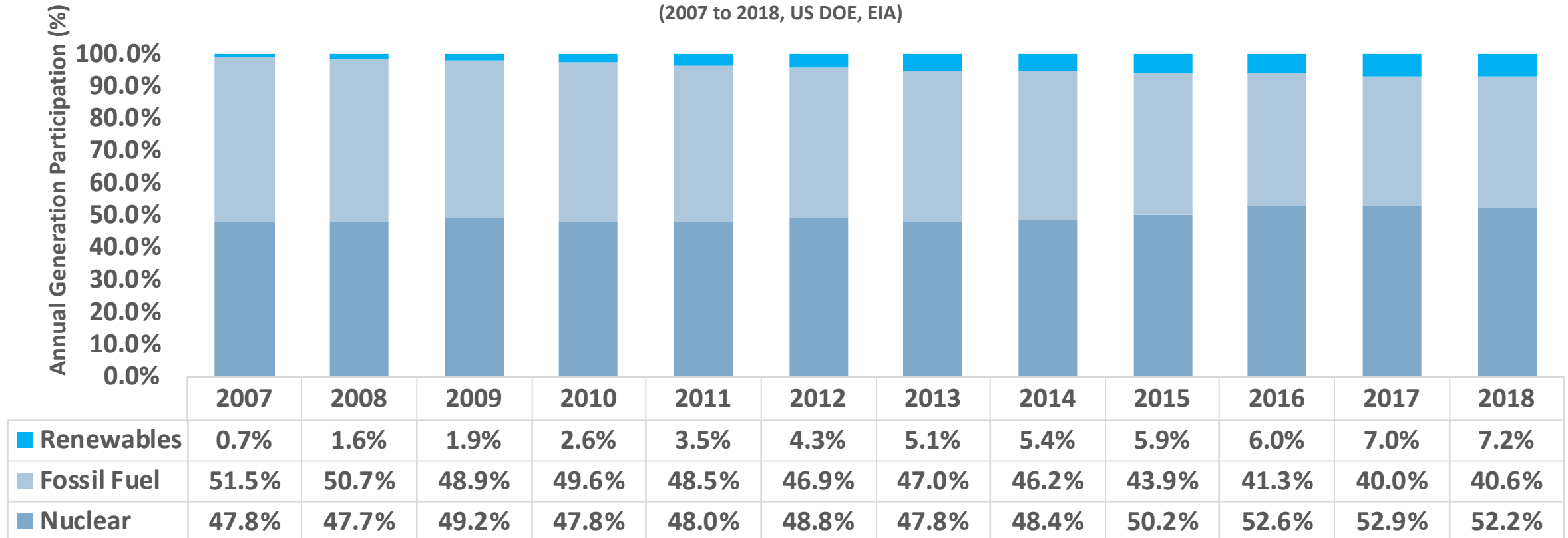
A comparison of electric vehicle Level 1 and Level 2 charging efficiency, 2014



Environmental Ally – Illinois Electricity Generation

There is a low presence and very low growth of renewables in the region

Illinois Electricity Generation Trends
(2007 to 2018, US DOE, EIA)



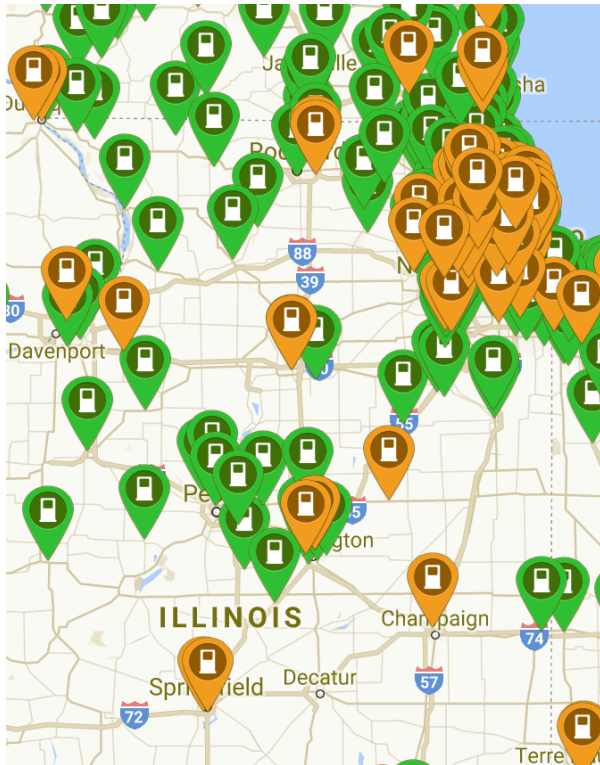
It is expected for wind and solar to increase 8,000 GWh/year between now and 2021
Currently at 12,000 GWh/year and expected to hit 20,000 in 2021

Source: The Power Bureau



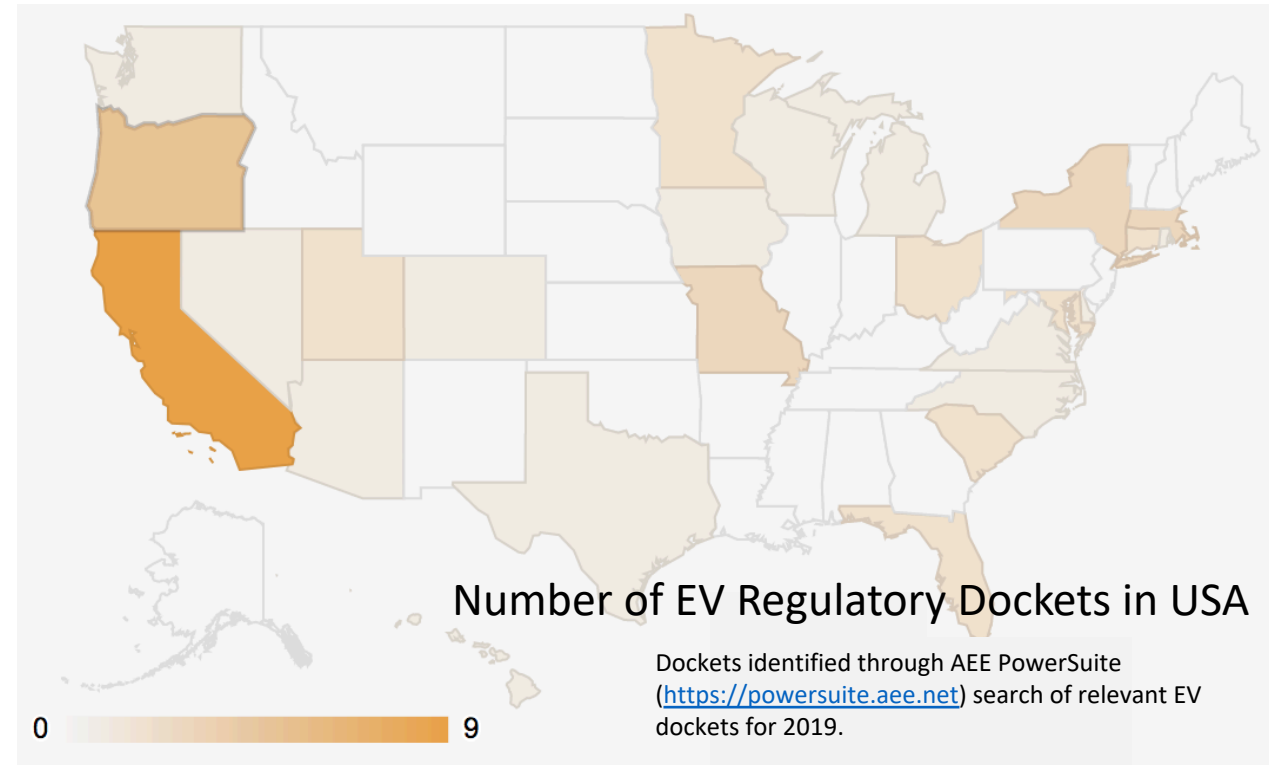
Economic Value Stacking – EV Ecosystem & Policies Support Job Growth

EV Charging Supports Economic Development and is Profitable



Focus on areas of greatest impact that address challenges to EV adoption

Government & Utility Involvement is Needed as EV Sales Grow Exponentially by 2025

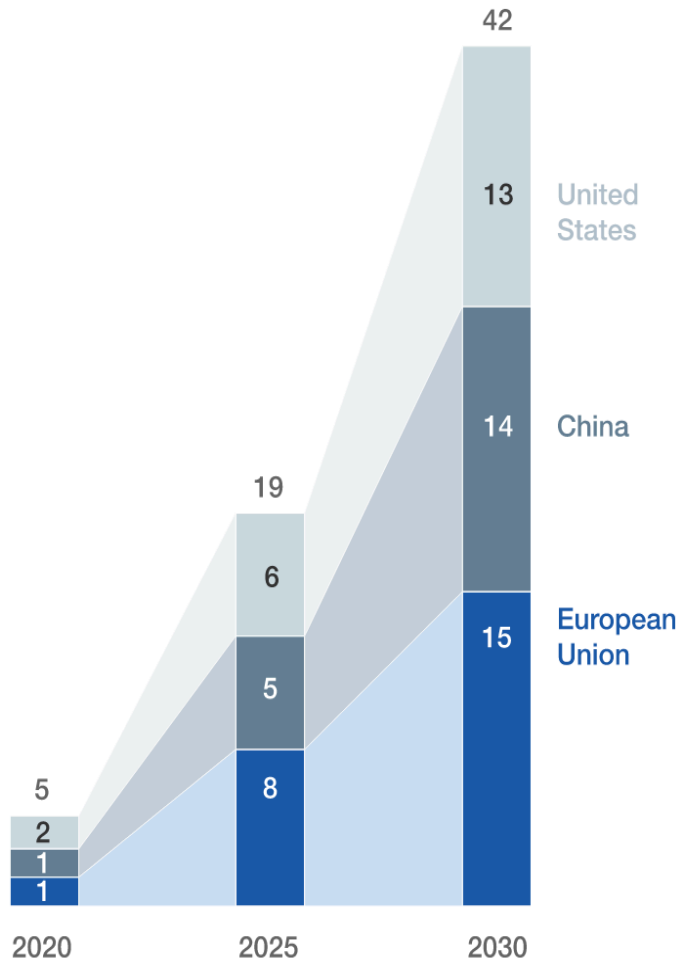


- Cities and States support acceleration
- Focus on most challenging areas that supports market development

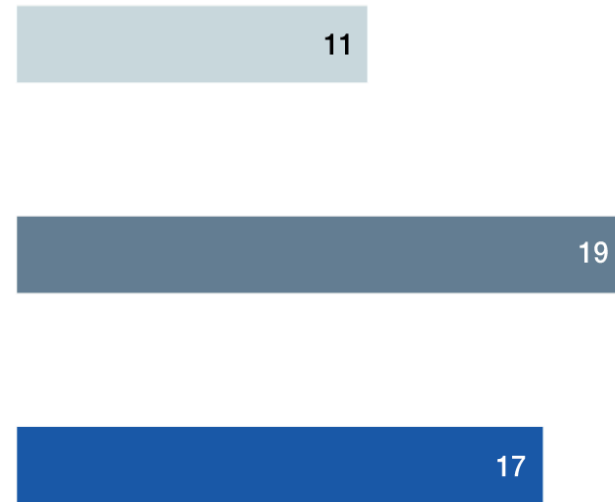


Economic Value Stacking – Embedded Future Workforce Development

Estimated number of chargers,¹
million



Estimated capital investment,
\$ billion

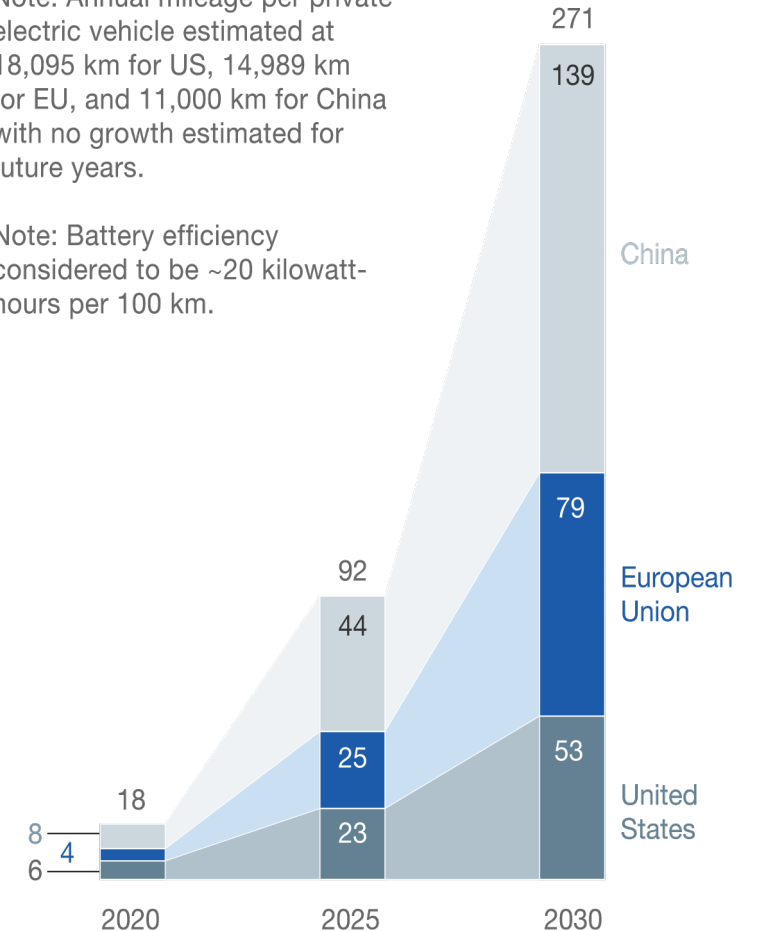


¹Figures may not sum, because of rounding.

Total energy demand, billion kilowatt-hours

Note: Annual mileage per private electric vehicle estimated at 18,095 km for US, 14,989 km for EU, and 11,000 km for China with no growth estimated for future years.

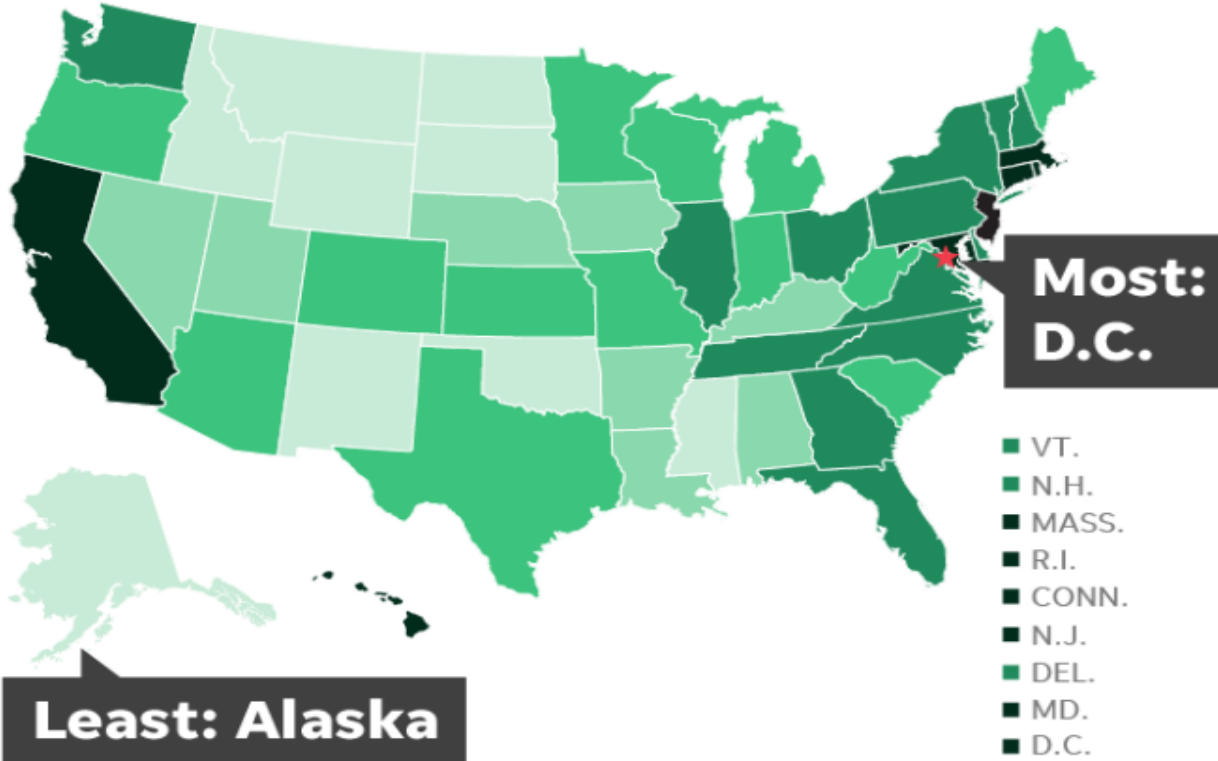
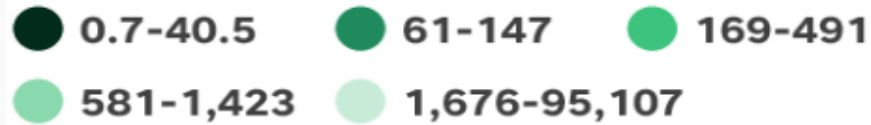
Note: Battery efficiency considered to be ~20 kilowatt-hours per 100 km.



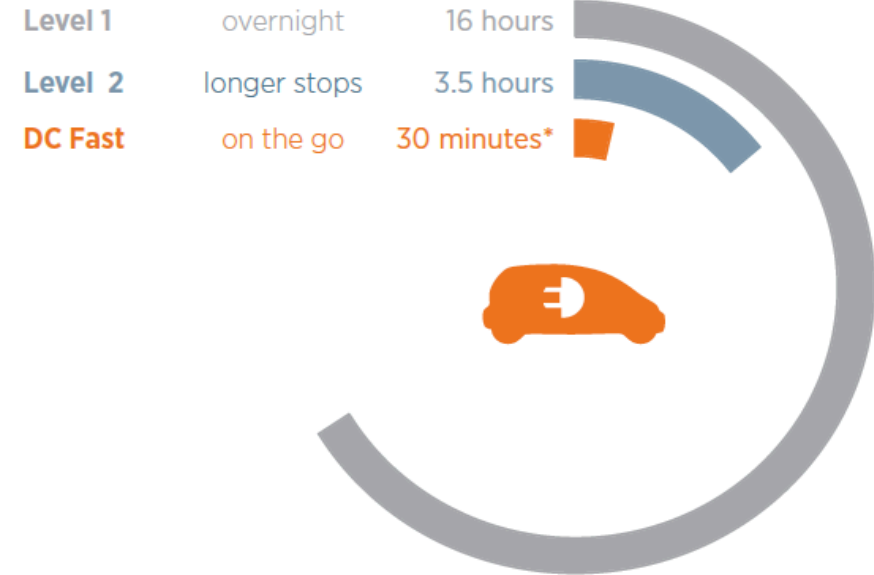


Consumer Need Nexus – Aligning with Human Behavior

Square miles per charging station.



Typical Time to Fill an 80 Mile Battery by Charging Type

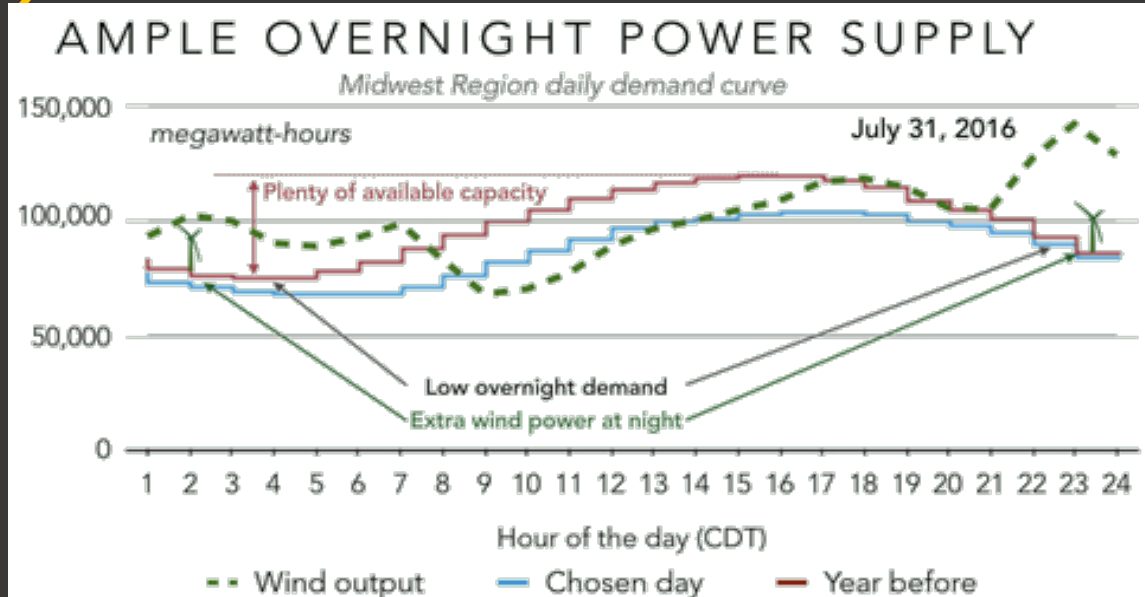


EV Charging Network is Critical for:

- Overcoming range anxiety***
- Aligning with consumer behaviors***
- Addressing “refuel time” limitations***



Societal Benefit Connector – Savings through EV Adoption



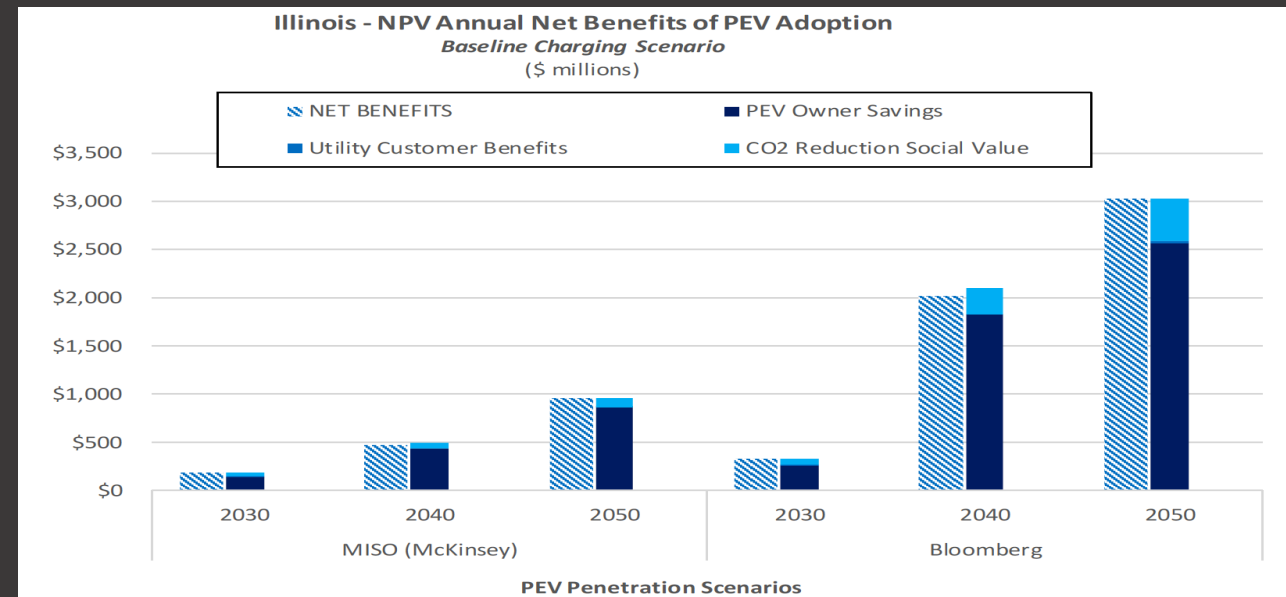
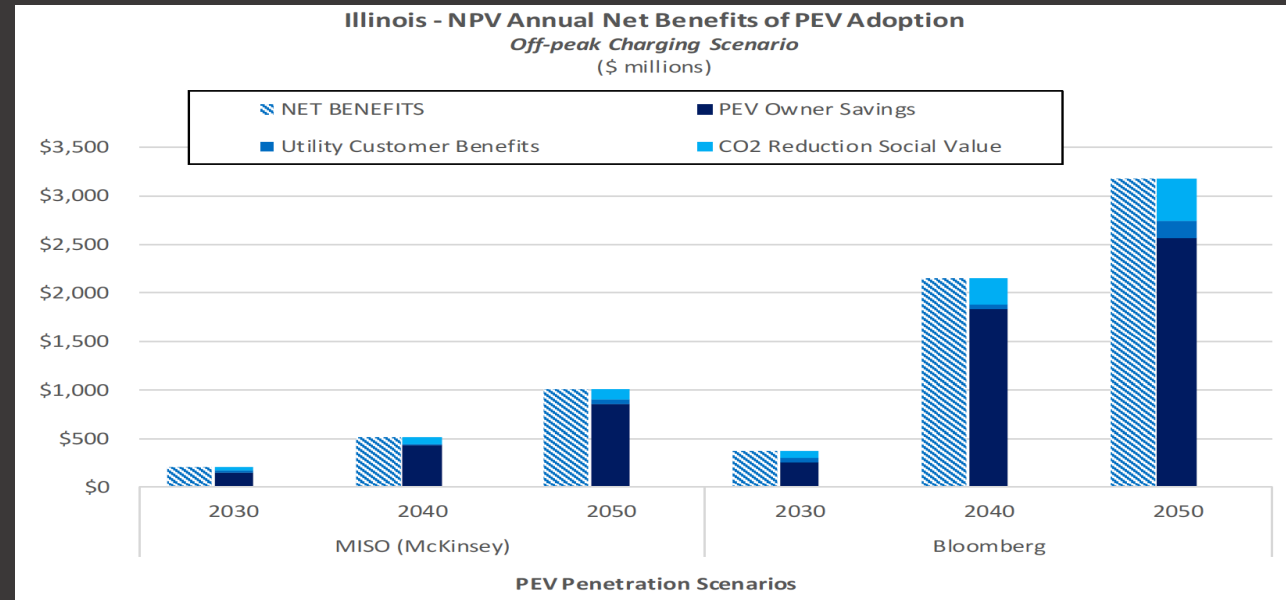
U.S. Energy Information Administration and Energy Democracy Initiative.

Consumers

- 90% as cash savings in vehicle operating costs
- 0.1% in reduction in annual electricity bills

Society

- 10% in the form of climate change mitigation due to reduced GHG emissions



Electric Vehicles Cost Benefit Analysis, MBI&A, 2017.

An aerial photograph of the Chicago skyline at dusk. The city's lights are glowing, and the Lake Michigan is visible in the background under a twilight sky.

THANK YOU

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